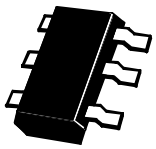
# 30V N-CHANNEL ENHANCEMENT MODE MOSFET

## SUMMARY

**$V_{(BR)DSS}$=30V; $R_{DS(ON)}$=0.11Ω; $I_D$=3.2A**



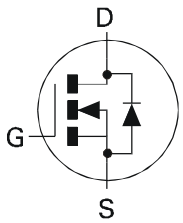
**SOT23-6**

### DESCRIPTION

This new generation of high density MOSFETs from Zetex utilise a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

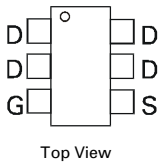
### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT23-6 package




### APPLICATIONS

- DC - DC Converters
- Power Management Functions
- Disconnect switches
- Motor control




Top View

### ORDERING INFORMATION

| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|---|---|---|---|
| ZXM62N03E6TA | 7 | 8mm embossed | 3000 units |
| ZXM62N03E6TC | 13 | 8mm embossed | 10000 units |

### DEVICE MARKING

- 2N03

## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | LIMIT | UNIT |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 30 | V |
| Gate Source Voltage | $V_{GS}$ | ± 20 | V |
| Continuous Drain Current ($V_{GS}$=10V; $T_A$=25°C)(b)<br>($V_{GS}$=10V; $T_A$=70°C)(b) | $I_D$ | 3.2<br>2.6 | A |
| Pulsed Drain Current (c) | $I_{DM}$ | 18 | A |
| Continuous Source Current (Body Diode) (b) | $I_S$ | 2.1 | A |
| Pulsed Source Current (Body Diode) | $I_{SM}$ | 18 | A |
| Power Dissipation at $T_A$=25°C (a)<br>Linear Derating Factor | $P_D$ | 1.1<br>8.8 | W<br>mW/°C |
| Power Dissipation at $T_A$=25°C (b)<br>Linear Derating Factor | $P_D$ | 1.7<br>13.6 | W<br>mW/°C |

## THERMAL RESISTANCE

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| Junction to Ambient (a) | $R_{\theta JA}$ | 113 | °C/W |
| Junction to Ambient (b) | $R_{\theta JA}$ | 73 | °C/W |

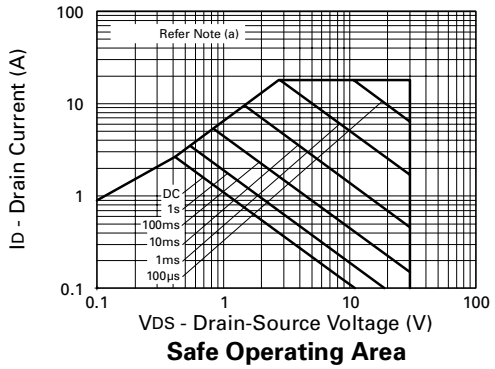
NOTES

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

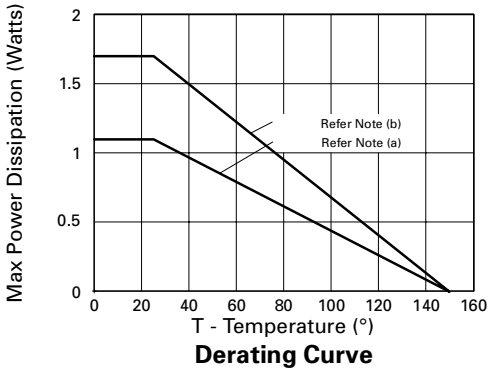
(b) For a device surface mounted on FR4 PCB measured at t≤5 secs.

(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.

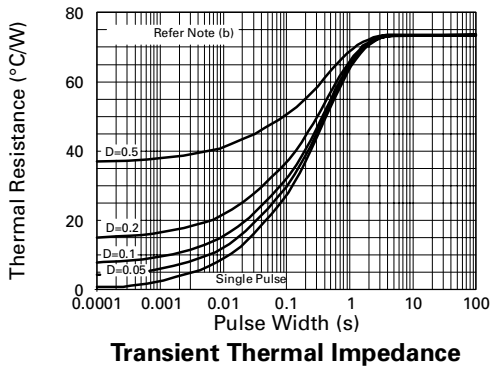
## CHARACTERISTICS



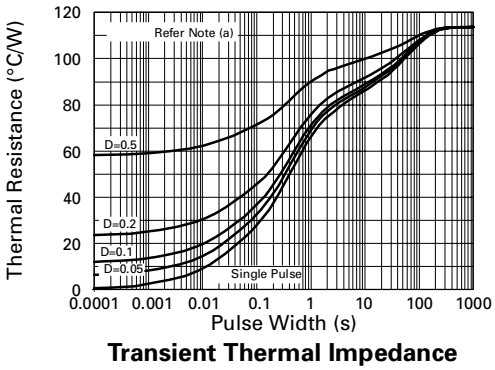

**Safe Operating Area**




**Derating Curve**




**Transient Thermal Impedance**




**Transient Thermal Impedance**

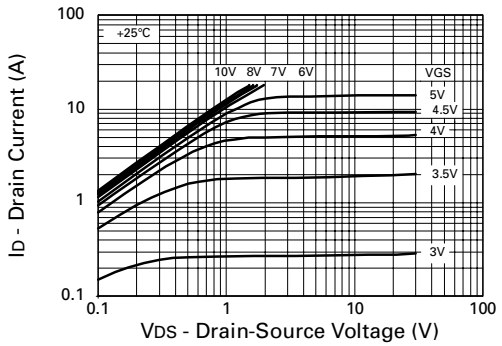
# ZXM62N03E6

## ELECTRICAL CHARACTERISTICS (at $T_{amb}$ = 25°C unless otherwise stated).

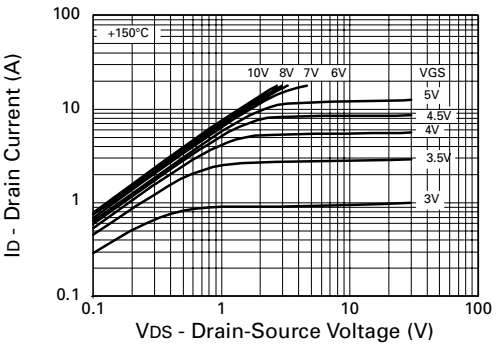
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---|---|---|---|---|---|---|
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 30 | | | V | $I_D$=250μA, $V_{GS}$=0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | | | 1 | μA | $V_{DS}$=30V, $V_{GS}$=0V |
| Gate-Body Leakage | $I_{GSS}$ | | | 100 | nA | $V_{GS}$=± 20V, $V_{DS}$=0V |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 1.0 | | | V | $I_D$=250μA, $V_{DS}$= $V_{GS}$ |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | | 0.11<br>0.15 | Ω<br>Ω | $V_{GS}$=10V, $I_D$=2.2A<br>$V_{GS}$=4.5V, $I_D$=1.1A |
| Forward Transconductance | $g_{fs}$ | 1.1 | | | S | $V_{DS}$=10V,$I_D$=1.1A |
| **DYNAMIC** (3) | | | | | | |
| Input Capacitance | $C_{iss}$ | | 380 | | pF | $V_{DS}$=25 V, $V_{GS}$=0V, f=1MHz |
| Output Capacitance | $C_{oss}$ | | 90 | | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | | 30 | | pF | |
| **SWITCHING**(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 2.9 | | ns | $V_{DD}$=15V, $I_D$=2.2A $R_G$=6.0Ω, $R_D$=6.7Ω (refer to test circuit) |
| Rise Time | $t_r$ | | 5.6 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 11.7 | | ns | |
| Fall Time | $t_f$ | | 6.4 | | ns | |
| Total Gate Charge | $Q_g$ | | | 9.6 | nC | $V_{DS}$=24V,$V_{GS}$=10V, $I_D$=2.2A (refer to test circuit) |
| Gate-Source Charge | $Q_{gs}$ | | | 1.7 | nC | |
| Gate Drain Charge | $Q_{gd}$ | | | 2.8 | nC | |
| **SOURCE-DRAIN DIODE** | | | | | | |
| Diode Forward Voltage (1) | $V_{SD}$ | | | 0.95 | V | $T_j$=25°C, $I_S$=2.2A, $V_{GS}$=0V |
| Reverse Recovery Time (3) | $t_{rr}$ | | 18.8 | | ns | $T_j$=25°C, $I_F$=2.2A, di/dt= 100A/μs |
| Reverse Recovery Charge (3) | $Q_{rr}$ | | 11.4 | | nC | |

(1) Measured under pulsed conditions. Width=300μs. Duty cycle ≤2% .
(2) Switching characteristics are independent of operating junction temperature.
(3) For design aid only, not subject to production testing.

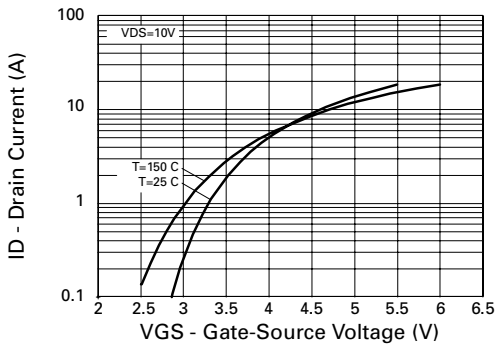
## TYPICAL CHARACTERISTICS



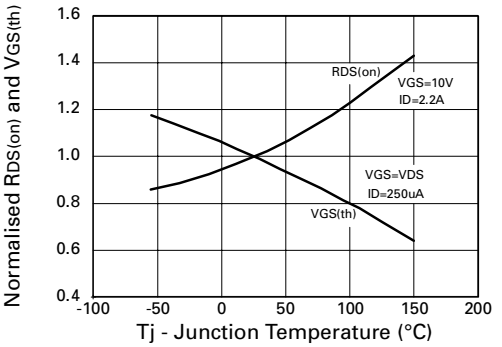

**Output Characteristics**



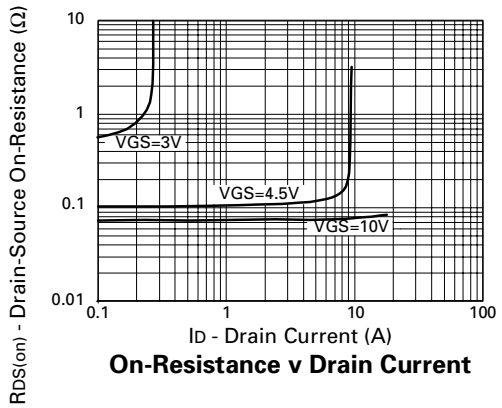

**Output Characteristics**



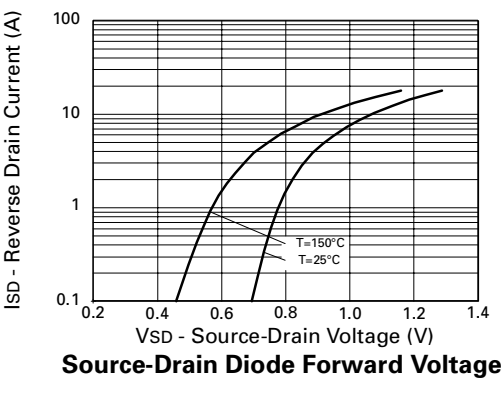

**Typical Transfer Characteristics**




**Normalised RDS(on) and VGS(th) v Temperature**

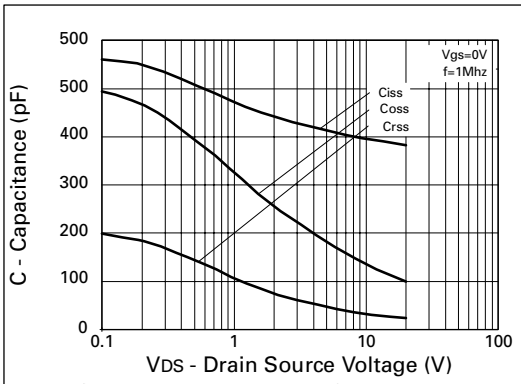



**On-Resistance v Drain Current**

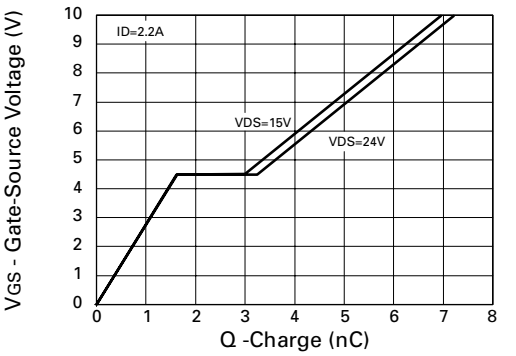



**Source-Drain Diode Forward Voltage**

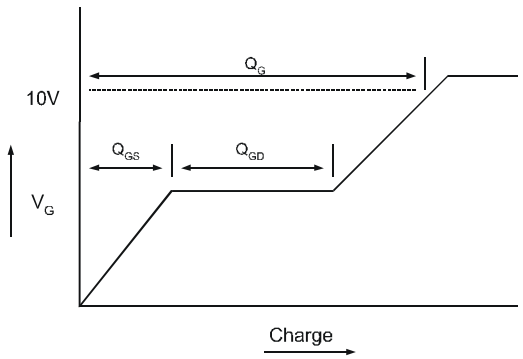
## TYPICAL CHARACTERISTICS



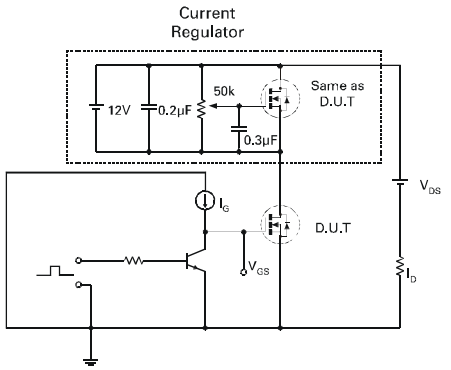

**Capacitance v Drain-Source Voltage**



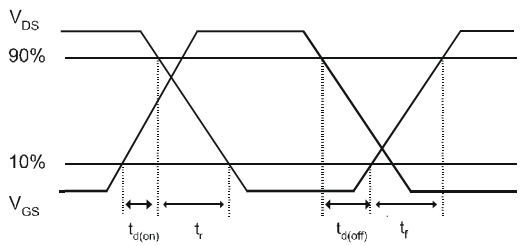

**Gate-Source Voltage v Gate Charge**



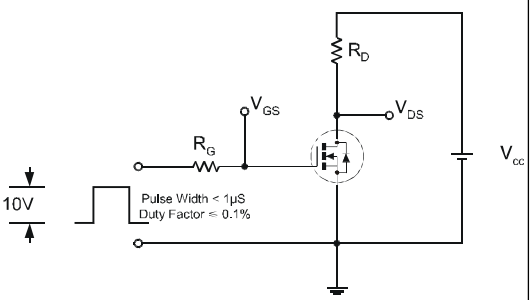

**Basic Gate Charge Waveform**




**Gate Charge Test Circuit**



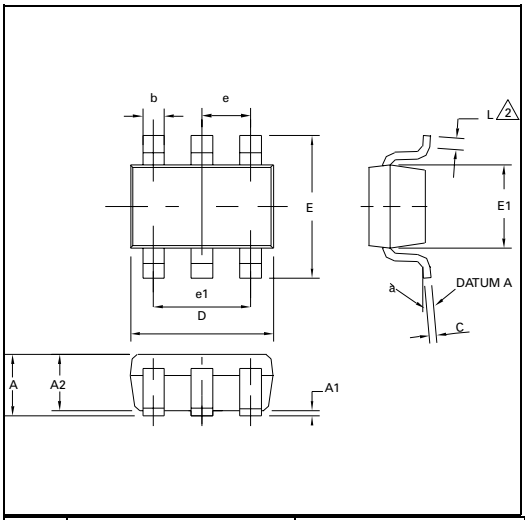

**Switching Time Waveforms**




**Switching Time Test Circuit**

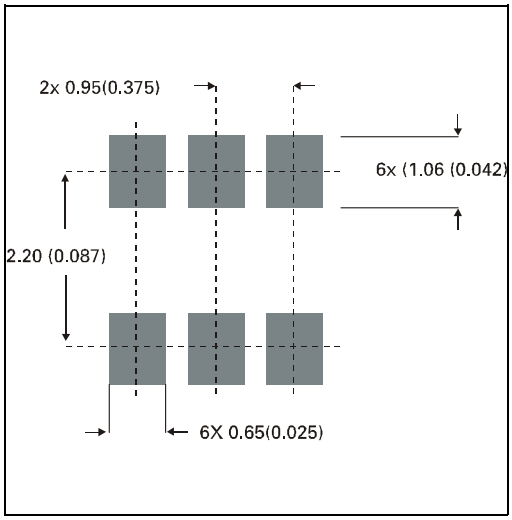
# ZXM62N03E6

## PACKAGE DIMENSIONS




| DIM | Millimetres | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.90 | 1.45 | 0.35 | 0.057 |
| A1 | 0.00 | 0.15 | 0 | 0.006 |
| A2 | 0.90 | 1.30 | 0.035 | 0.051 |
| b | 0.35 | 0.50 | 0.014 | 0.019 |
| C | 0.09 | 0.20 | 0.0035 | 0.008 |
| D | 2.80 | 3.00 | 0.110 | 0.118 |
| E | 2.60 | 3.00 | 0.102 | 0.118 |
| E1 | 1.50 | 1.75 | 0.059 | 0.069 |
| L | 0.10 | 0.60 | 0.004 | 0.002 |

## PAD LAYOUT DETAILS





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